

Application No. 10/801,085  
Response dated March 26, 2007  
Reply to Office action dated 03/19/2007

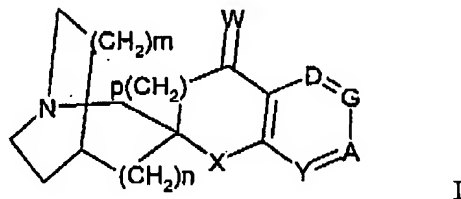
MAR 26 2007

**Amendments to the claims:**

This listing of claims will replace all previous versions, and listings, of claims in this application.

**Listing of Claims:**

Claim 1 (previously presented)      A pharmaceutical composition comprising a compound of formula I



wherein n is 0;

m is 1;

p is 0;

Y is CH, N or NO

X is oxygen;

W is two H moieties;

A is C(R<sup>2</sup>);

G is C(R<sup>3</sup>);

D is C(R<sup>4</sup>);

Y is N;

R<sup>1</sup> is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl;

R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> are independently hydrogen, halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>2</sub>-C<sub>4</sub> alkenyl, C<sub>2</sub>-C<sub>4</sub> alkynyl, aryl, heteroaryl, OH, OC<sub>1</sub>-C<sub>4</sub> alkyl, CO<sub>2</sub>R<sup>1</sup>, -CN, -NO<sub>2</sub>, -NR<sup>5</sup>R<sup>6</sup>, -CF<sub>3</sub>, -OSO<sub>2</sub>CF<sub>3</sub>, or R<sup>2</sup> and R<sup>3</sup>, or R<sup>3</sup> and R<sup>4</sup>, respectively, may together form another six membered aromatic ring sharing A and G, or G and D, respectively, and substituted with one to two of the

Application No. 10/801,085

Response dated March 26, 2007

Reply to Office action dated 03/19/2007

following substituents: independently hydrogen, halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>2</sub>-C<sub>4</sub> alkenyl, C<sub>2</sub>-C<sub>4</sub> alkynyl, aryl, heteroaryl, OH, OC<sub>1</sub>-C<sub>4</sub> alkyl, CO<sub>2</sub>R<sup>1</sup>, -CN, -NO<sub>2</sub>, -NR<sup>5</sup>R<sup>6</sup>, -CF<sub>3</sub>, OSO<sub>2</sub>CF<sub>3</sub>;

R<sup>5</sup> and R<sup>6</sup> are independently hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C(O)R<sup>7</sup>, C(O)NHR<sup>8</sup>, C(O)OR<sup>9</sup>, SO<sub>2</sub>R<sup>10</sup> or may together be (CH<sub>2</sub>)<sub>j</sub>Q(CH<sub>2</sub>)<sub>k</sub> where Q is O, S, NR<sup>11</sup>, or a bond;

j is 2 to 7;

k is 0 to 2;

R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, and R<sup>11</sup> are independently C<sub>1</sub>-C<sub>4</sub> alkyl, aryl, or heteroaryl;

together with at least one inert pharmaceutically acceptable diluent or carrier.

Claim 2 (previously presented)      A pharmaceutical composition according to Claim 1, comprising a compound selected from:

spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-bromospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-phenylspiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-nitrospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

1'-chlorospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]isoquinoline];

5'-(phenylcarboxamido)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-(phenylaminocarbonylamino)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-(phenylsulfonylamido)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-aminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N-methylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N,N-dimethylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N,N-diethylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N-ethylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N-benzylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N-formamidospino[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

5'-N-acetamidospino[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];

Application No. 10/801,085

Response dated March 26, 2007

Reply to Office action dated 03/19/2007

spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]isoquinoline];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]quinoline];  
5'-ethenylspiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(E)-(phenylethenyl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(4-morpholino)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(1-azetidiny)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(E)-(2-(4-pyridyl)ethenyl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(E)-(2-(2-pyridyl)ethenyl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(2-trimethylsilylethynyl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-ethynylspiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(2-furyl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-(3-pyridyl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-methylspiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine-5' carbonitrile];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine-5' carboxamide];  
5'-N'-(3-chlorophenyl)ureidoaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-  
furo[2,3-b]pyridine];  
5'-N'-(2-nitrophenyl)ureidoaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-  
furo[2,3-b]pyridine];  
4'-chlorospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4'-methoxyspiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4'-phenylthiospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4'-(N-2-aminoethyl)aminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4'-Phenylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4'-methylaminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4'-(4-N-methylpiperazin-1-yl)spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
4-chloro-spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[3,2-c]pyridine];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[3,2-c]pyridine];

Application No. 10/801,085

Response dated March 26, 2007

Reply to Office action dated 03/19/2007

6'-fluorospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine-6'-carbonitrile], and  
6'-chlorospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
or an enantiomer, or a pharmaceutically acceptable salt thereof.

Claim 3 (previously presented)      A pharmaceutical composition according to Claim 1,  
comprising a compound selected from:

5'-bromospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-phenylspiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-nitrospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
5'-aminospiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]isoquinoline];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]quinoline];  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine], and  
spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine-5'-carboxamide];  
or an enantiomer, or a pharmaceutically acceptable salt thereof.

Claim 4 (original)      A pharmaceutical composition according to Claim 1, comprising  
(2'R)-spiro[1-azabicyclo[2.2.2]octane-3,2'-(3'H)-furo[2,3-b]pyridine];  
or a pharmaceutically acceptable salt thereof.

Claim 5 (original)      A pharmaceutical composition according to Claim 1, comprising less than  
80% by weight of said compound of formula I in admixture with an inert pharmaceutically  
acceptable diluent or carrier.

Application No. 10/801,085  
Response dated March 26, 2007  
Reply to Office action dated 03/19/2007

**Claim 6 (original)** A pharmaceutical composition according to Claim 1, comprising less than 50% by weight of said compound of formula I in admixture with an inert pharmaceutically acceptable diluent or carrier.

**Claim 7 (original)** A pharmaceutical composition according to Claim 1, wherein said at least one inert pharmaceutically acceptable diluent or carrier is selected from lactose, starch, talc, stearic acid, tartaric acid, water, alcohols, glycerin, vegetable oils and natural or hardened oils or waxes.

**Claim 8 (previously presented)** A pharmaceutical composition according to Claim 1, wherein said composition is formulated as:

a tablet or dragee and wherein said at least one inert pharmaceutically acceptable diluent or carrier is selected from lactose, starch, talc, stearic acid;

a capsules wherein said at least one inert pharmaceutically acceptable diluent or carrier is selected from tartaric acid or lactose; or

an injectable solution wherein said at least one inert pharmaceutically acceptable diluent or carrier is selected from water, alcohols, glycerin, vegetable oils; or

a suppository wherein said at least one inert pharmaceutically acceptable diluent or carrier is selected from natural or hardened oils or waxes.

**Claim 9 (original)** A method for treating or preventing a condition or disorder arising from dysfunction of nicotinic acetylcholine receptor neurotransmission comprising administering a pharmaceutical composition according to Claim 8.

Application No. 10/801,085  
Response dated March 26, 2007  
Reply to Office action dated 03/19/2007

Claim 10 (original) A method for treating or preventing a condition or disorder arising from dysfunction of nicotinic acetylcholine receptor neurotransmission comprising administering a pharmaceutical composition according to Claim 1.

Claim 11 (original) The method of Claim 10, comprising administering a daily dosage of of said compound of formula I from about 0.1 mg to about 20 mg per kg of body weight in divided doses 1 to 4 times a day or in sustained release form.

Claim 12 (original) The method of Claim 10, comprising administering a total daily dose of said compound of formula I in the range of from 5 mg to 1,400 mg.

Claim 13 (original) The method of Claim 12, comprising administering a total daily dose of said compound of formula I in the range of from 10 mg to 100 mg.

Claim 14 (original) The method of Claim 10, comprising administering a total daily dose of said compound of formula I by oral administration of from 2 mg to 1,400 mg admixed with a solid or liquid pharmaceutical carrier or diluent.

Claim 15 (original) The method of Claim 10 wherein said condition or disorder is selected from schizophrenia, mania, manic depression, or anxiety.

Application No. 10/801,085  
Response dated March 26, 2007  
Reply to Office action dated 03/19/2007

Claim 16 (original) The method of Claim 10 wherein said condition or disorder is selected from Alzheimer's disease, learning deficit, cognition deficit, attention deficit, memory loss, or Attention Deficit Hyperactivity Disorder.

Claim 17 (original) The method of Claim 10 wherein said condition or disorder is selected from pain, chronic pain, Parkinson's disease, Huntington's disease, Tourette's syndrome, or neurodegenerative disorders in which there is loss of cholinergic synapses.

Claim 18 (original) A method for inducing the cessation of smoking, or for the treatment or prophylaxis of nicotine addiction comprising administering a pharmaceutical composition according to Claim 1.

Claim 19 (currently amended) A process for the preparation of a pharmaceutical composition according to Claim 1 which comprises mixing ~~the ingredients~~.

a compound of formula I, or an enantiomer thereof, or a pharmaceutically acceptable salt thereof, in an amount to provide less than about 80% by weight of said compound with at least one inert pharmaceutically acceptable diluent or carrier selected from lactose, starch, talc, stearic acid or tartaric acid.

Claim 20 (new) A process according to Claim 19 comprising mixing a compound of formula I, or an enantiomer thereof, or a pharmaceutically acceptable salt thereof, in an amount to provide less than about 50% by weight of said compound with at least one inert pharmaceutically acceptable diluent or carrier selected from lactose, starch, talc, stearic acid or tartaric acid.